

$$y^3 - 2x^2 = 2x - 1 \Rightarrow y^3 = 2x^2 + 2x - 1 \quad (1)$$

$$\Rightarrow \begin{cases} y_1^3 = 2x_1^2 + 2x_1 - 1 \\ y_2^3 = 2x_2^2 + 2x_2 - 1 \end{cases} \xrightarrow{x_1 = x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2 = ? \text{ این تابع تابع است؟}$$

$$b) x \cos y = y \cos x \text{ if } x = 90^\circ, 90 \cos y = y \cos 90^\circ$$

$$= 90 \cos y = y \times 0 \Rightarrow 90 \cos y = 0 \Rightarrow \cos y = 0$$

$$\Rightarrow y = k\pi + \frac{\pi}{2}$$

این تابع تابع نیست زیرا برای x چندین y وجود دارد.

$$ج) \frac{x+y}{2} = \sqrt{xy} \quad x, y > 0 \Rightarrow x+y = 2\sqrt{xy} \xrightarrow{\text{توان ۲}} x^2 + y^2 + 2xy = 4xy$$

$$\Rightarrow x^2 - 2xy + y^2 = 0 \Rightarrow (x-y)^2 = 0 \Rightarrow x = y \Rightarrow \text{این تابع تابع نیست.}$$

$$> x^2 + 2x - y^3 - 2y = 0 \Rightarrow x^2 + 2x = y^3 + 2y \Rightarrow x(y^2 + 2) = y^3 + 2y$$

$$\Rightarrow x = \frac{y^3 + 2y}{y^2 + 2} \xrightarrow{+ \text{در هر دو طرف } y^2 + 2} x = \frac{y(y^2 + 2)}{y^2 + 2} \Rightarrow x = y \Rightarrow \text{این تابع تابع است.}$$

$$f(n) = \begin{cases} 2n^2 - b & ; |n-1| \geq 2 \Rightarrow n-1 \geq 2 \Rightarrow n \geq 3 \\ a+2n & ; -3 \leq n \leq -1 \end{cases} \xrightarrow{\text{استفاده}} -3 \leq n \leq -1$$

$$\Rightarrow \text{if } n = -1 \Rightarrow 2(-1)^2 - b = a + 2(-1) \Rightarrow 2 - b = a - 2 \Rightarrow a + b = 4$$

$$\text{if } n = -3 \Rightarrow 2(-3)^2 - b = a + 2(-3) \Rightarrow 18 - b = a - 6 \Rightarrow a + b = 24$$

$$\Rightarrow a+b \in [4, 24] \quad \text{و} \quad 4 \leq a+b \leq 24$$

$$(الف) f(x) = \sqrt{\log_{\frac{1}{3}} x - 1} \Rightarrow \log_{\frac{1}{3}} x - 1 \geq 0 \Rightarrow x > \frac{1}{3} \quad (1)$$

(4)

$$x > 0, x \neq 1 \quad (2)$$

$$\Rightarrow D_f = (1) \cap (2) \cap (3)$$

$$\log_{\frac{1}{3}} x - 1 \geq 0 \Rightarrow \log_{\frac{1}{3}} x \geq 1 \Rightarrow x \geq \frac{1}{3} \quad (3) \Rightarrow D_f = \left[\frac{1}{3}, +\infty \right) - \{1\}$$

$$(ب) f(x) = \log \frac{1}{4 + \sqrt{|x|} - |x|} \quad \sqrt{|x|} = t \Rightarrow \frac{1}{-t^2 + t + 4} \geq 0 \Rightarrow \frac{1}{t^2 - t - 4} < 0$$

$$\Rightarrow \frac{1}{(t-3)(t+2)} < 0 \Rightarrow \frac{-2}{+3} - \frac{3}{+} \Rightarrow t \in (-2, 3) \Rightarrow \sqrt{|x|} \in [0, 3)$$

$$\Rightarrow |x| \in [0, 9) \Rightarrow x \in (-9, 9) \quad (1)$$

$$-t^2 + t + 4 \neq 0 \Rightarrow t^2 - t - 4 \neq 0 \Rightarrow (t-3)(t+2) \neq 0 \Rightarrow t \neq 3, -2$$

$$\Rightarrow \sqrt{|x|} \neq -2 \Rightarrow \text{همیشه صحت دارد} \quad \sqrt{|x|} \neq 3 \Rightarrow x \neq \pm 9 \quad (2)$$

$$\Rightarrow D_f = (1) \cap (2) = (-9, 9)$$

$$y = \sqrt{\frac{3x+2}{x+b}} + a \quad D_f = (2, +\infty)$$

(5)

با توجه به دامنه ۲ ریشه فخرج است

$$\Rightarrow 2+b=0 \Rightarrow b=-2$$

$$y = \sqrt{f(n) - n + 1} \quad f(n) = \begin{cases} 2n - 1 & ; [n] > t \Rightarrow [n] \geq \omega \Rightarrow n \geq \omega \\ 2n + 3 & ; [n] \leq t \Rightarrow n < \omega \end{cases} \quad (1)$$



$$f(n) - n + 1 \geq 0 \Rightarrow f(n) \geq n - 1$$

$$\Rightarrow 2n - 1 \geq n - 1 \Rightarrow n \geq 0 \xrightarrow{\wedge(n \geq \omega)} n \geq \omega \quad (1)$$

$$\Rightarrow 2n + 3 \geq n - 1 \Rightarrow 3n \geq -4 \Rightarrow n \geq -\frac{4}{3} \xrightarrow{\wedge(n < \omega)} -\frac{4}{3} \leq n < \omega \quad (2)$$

$$\Rightarrow D_f = (1) \cup (2) = \left[-\frac{4}{3}, +\infty \right)$$

$$y = \frac{2fn^3 + 3fn^2 + 11n + 3}{(2n^3 + 2n + 1)^2} = \frac{3(12n^3 + 12n^2 + 4n + 1)}{((2n+1)^2)^2} = \frac{3(2n+1)^3}{(2n+1)^4} \quad (9)$$

$n = -\frac{1}{2} : \text{محل صفر}$

$$= \frac{3}{2n+1} \xrightarrow{\text{محل صفر}} \frac{1}{2} \Rightarrow \mathbb{R} = \left\{ -\frac{1}{2} \right\}$$

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دائری تابع

$$y = \sqrt{1 - \log(2n - a)} \Rightarrow 1 - \log(2n - a) \geq 0 \Rightarrow \log(2n - a) \leq 1 \quad (10)$$

$$\Rightarrow 2n - a \leq 10 \Rightarrow n \leq \frac{10+a}{2} \quad \left. \begin{array}{l} \text{استرلاب} \\ \frac{1}{2} \end{array} \right\} \frac{a}{2} \leq n \leq \frac{10+a}{2} \quad b \leq n \leq c$$

$$2n - a \geq 0 \Rightarrow n \geq \frac{a}{2}$$

$$\Rightarrow b = \frac{a}{2}, c = \frac{10+a}{2} \Rightarrow c - b = \omega + \frac{a}{2} - \frac{a}{2} = \omega \Rightarrow \underline{c - b = \omega}$$